The economic burden of HER2+ breast cancer and the targeted therapies epidemiological & economic impact in the Dominican Republic

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Introduction

Breast cancer is the most common cancer among women worldwide, with HER2-positive (HER2+) subtypes representing a significant portion of cases. (1) In the Dominican Republic, HER2+ breast cancer constitutes a major health concern (3,412 new cases for 2020), accounting for over a third (33.64%) of all female cancer diagnoses. (2) The aggressive nature of HER2+ breast cancer requires the use of targeted therapies following the ESMO guidelines, which come with high costs compared to chemotherapy. This study quantifies the economic burden of HER2+ breast cancer and evaluates the treatment impact of HER2+ targeted therapies in the Dominican Republic. (3) Using real-world data and expert opinions, this research aims to provide a comprehensive analysis of the financial impacts of HER2+ breast cancer burden and the impact of use targeted therapies, offering valuable insights for healthcare policy and management in the Dominican Republic.

Methods

This study employs a mixed-methods approach to evaluate the economic impact and clinical outcomes of HER2+ breast cancer treatments in the Dominican Republic. Initially, a Delphi Panel with 11 oncologists representing both the public and private healthcare sectors in the major cities of Dominican Republic (Santiago and Santo Domingo) was performed with individual sessions (1:1). These experts provided insights based on their clinical experience to estimate real-world patient management practices, resource utilization, and the frequency of healthcare interventions.

A bottom-up cost analysis was conducted to gather precise cost data directly related to the management of HER2+ breast cancer across different stages of care. Costs in 2023 USD were compiled from public healthcare purchase records, expert panel reports, and specialty pharmacies, ensuring comprehensive coverage of both public and private sector expenses.

To assess the impact of targeted therapies, a population estimation model was utilized. This model calculated the potential number of avoided relapses, prevented metastases, and the consequent economic savings under three scenarios: chemotherapy alone, current treatment regimes including Trastuzumab, and an ideal scenario featuring a combination of Chemotherapy, Trastuzumab, Pertuzumab, and Trastuzumab+Emtansine. The outcomes measured included life years (LYs) gained, quality-adjusted life years (QALYs), and direct cost savings.

Results

The assessment of the economic impact and health outcomes of different treatment strategies for HER2+ breast cancer in the Dominican Republic, are:
In terms of costs, the management of a HER2+ breast cancer patient varies significantly across different stages. The annual healthcare expenses were observed as follows: USD 48,963.38 for neoadjuvant treatment, USD 48,827.63 for adjuvant treatment (for both neo-adjuvant and adyuvant the cost of the surgery was not considered as it was so variable due to the differentiation between the clinics), USD 71,012.30 for first-line metastatic treatment, and USD 57,495.06 for second-line metastatic treatment. This data is shown in figure 1 & 2.
The introduction of targeted therapies substantially improved clinical outcomes and economic efficiency. Under the current treatment regime that includes Chemotherapy and Trastuzumab, the study found that 32 recurrences and 29 metastases were prevented, contributing to 860 life years and 682 quality-adjusted life years gained. This scenario also resulted in cost savings amounting to USD 4,363,251. Furthermore, an ideal treatment scenario utilizing a combination of Chemotherapy, Trastuzumab, Pertuzumab, and Trastuzumab+Emtansine showed greater benefits. This approach avoided 59 recurrences and 54 metastases, with 1,569 life years and 1,243 quality-adjusted life years gained. Economically, this scenario saved approximately USD 7,959,759. This information could be seen in figure 3-6.

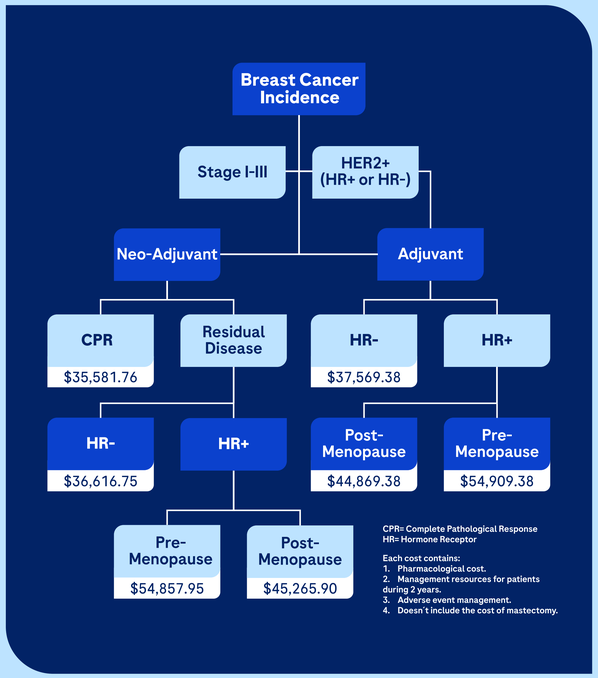

Figure 1. Burden of HER2+ breast cancer management from the perspective of the third-payer in Dominican Republic during 2-year patients' follow-up in adjuvant and neo-adjuvant stages.

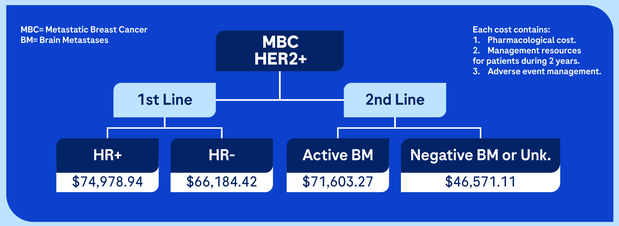

Figure 2. Burden of HER2+ breast cancer management from the perspective of the third-payer in Dominican Republic during 2-year patients' follow-up in metastatic stages.

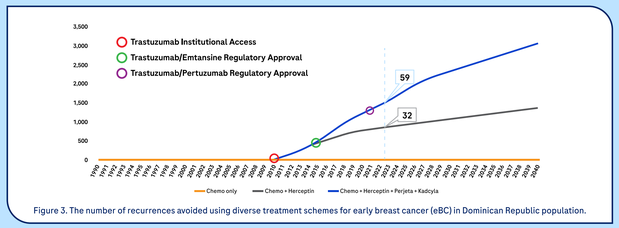

Figure 3. The number of recurrences avoided using diverse treatment schemes for early breast cancer (eBC) in Dominican Republic population.

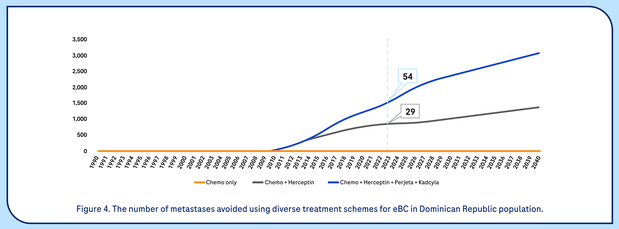

Figure 4. The number of metastases avoided using diverse treatment schemes for eBC in Dominican Republic population.

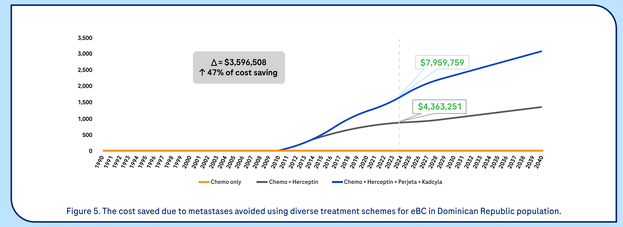

Figure 5. The cost saved due to metastases avoided using diverse treatment schemes for eBC in Dominican Republic population.

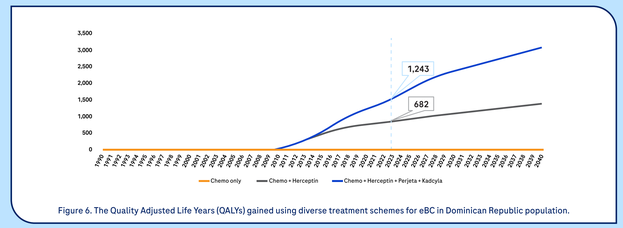

Figure 6. The Quality Adjusted Life Years (QALYs) gained using diverse treatment schemes for eBC in Dominican Republic population.

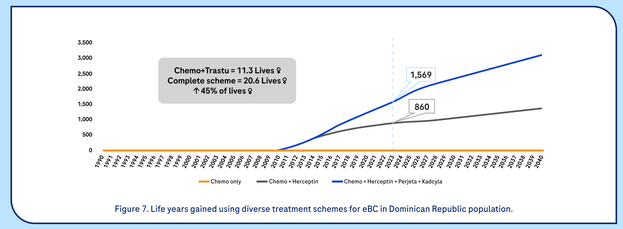

Figure 7. Life years gained using diverse treatment schemes for eBC in Dominican Republic population.

Discussion

The study highlight the critical importance of early intervention in the treatment of HER2+ breast cancer, particularly with the implementation of targeted therapies. Early treatment not only improves clinical outcomes but also significantly reduces the economic burden associated with the management of metastatic disease. By administering targeted therapies during the neoadjuvant and adjuvant stages, the progression to more costly metastatic care can be decreased. This approach conserves valuable healthcare resources and enhances patient prognosis by avoiding the escalation of care required for more advanced disease states.

Moreover, the study illustrates the detrimental effects of delayed access to these advanced therapies. Each year of delay in making targeted therapy regimens available (such as those including Chemotherapy, Trastuzumab, Pertuzumab, and Trastuzumab+Emtansine) results in clinical and economic losses. Specifically, the absence of these treatments leads to higher recurrence rates, more cases of metastasis, and a significant increase in healthcare costs due to the need for more intensive and prolonged treatment of advanced disease stages. Financially, this translates into millions of dollars in lost savings that could have been avoided with earlier treatment intervention.

Conclusion

The treatment of HER2+ BC in DR is more expensive in the metastatic stages than in neo-adyuvance or adyuvance stages, the use of targeted therapies helps to improve patient's health, avoid metastases, gain LYs & QALYs, and save money from the metastases avoided.

References:

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